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TWO SUCCESSFUL CASES OF
BRAIN SURGERY.

BY

CHARLES B. NANCREDE, M.D.,

SENIOR SURGEON TO THE EPISCOPAL HOSPITAL; SURGEON TO THE
JEFFERSON MEDICAL COLLEGE HOSPITAL, PHILADELPHIA.

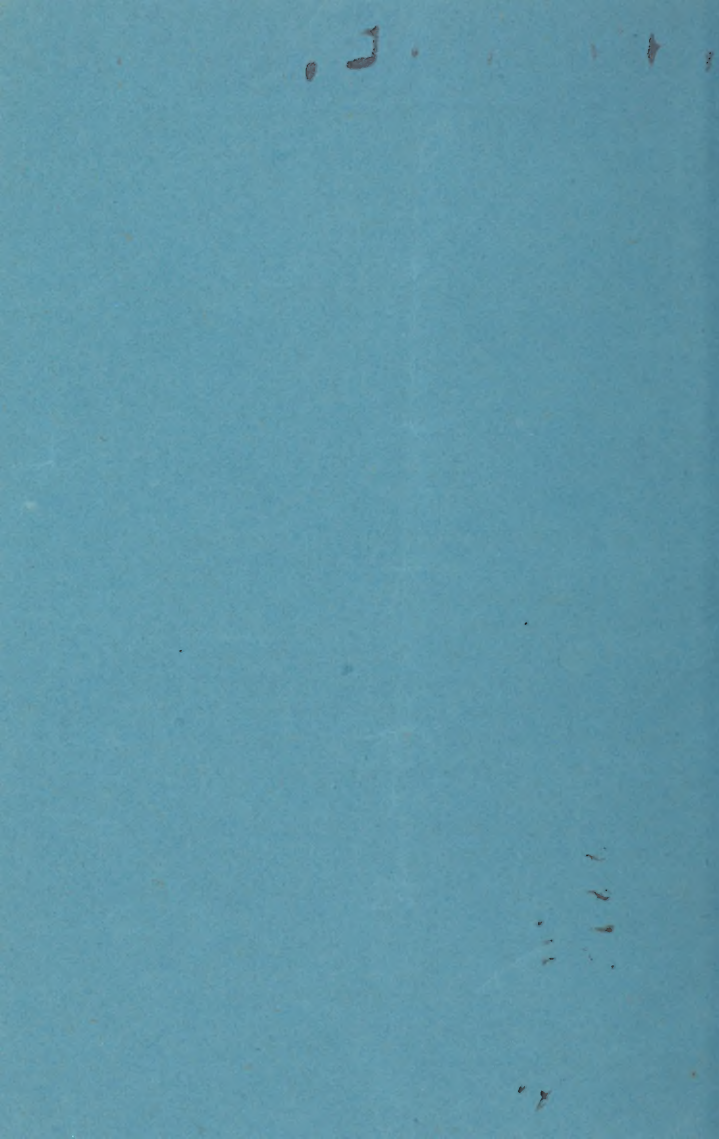
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TWO SUCCESSFUL CASES OF BRAIN SURGERY.¹

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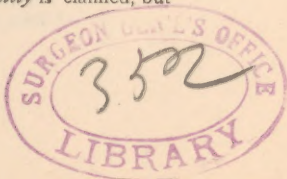
SENIOR SURGEON TO THE EPISCOPAL HOSPITAL; SURGEON TO THE
JEFFERSON MEDICAL COLLEGE HOSPITAL, PHILADELPHIA.

I AM fully warranted, I believe, in reporting the following cases at this time, without waiting for many months to ascertain the ultimate condition of the patients, because each case involves one or more of the essentially new principles of modern brain-surgery, as yet a comparatively unexplored field, accounts of each new inroad upon which should be at once published for the guidance, encouragement, or warning of those so eagerly pressing forward in the same direction.

In the annual oration which I had the honor of delivering before the Philadelphia Academy of Surgery, in January, 1888, I emphasized several procedures which, while not new,² certainly were *not* "known to every one," as stated in a review of my

¹ Read before the Philadelphia Academy of Surgery, November 6, 1888.

² I need hardly point out that *no originality* is claimed, but merely the strong emphasis.



remarks; nay, more, so far as I am aware, they have never been practised in this city, although taught by Professors Agnew and S. W. Gross. I shall merely quote part of what I then said as a preliminary to the history of my first case, which admirably illustrates the practical value of some of the principles enunciated:

"The general principles governing the treatment of compound skull-fractures are strictly applicable to gunshot wounds, so far as the bone lesions are concerned, Wharton's¹ tables so conclusively show the ultimate evils of the retention of a foreign body in the brain, that if the operation can be done without fatal injury to the encephalon, balls should always be removed, since even primarily such injuries are certain to be followed by suppurative inflammation, which too commonly is of the diffused form, when death is inevitable. The most superficial glance at the histories of recoveries after apparently hopeless brain injuries, shows that the result was due to free drainage, as in the famous tamping-iron case, and one of extensive shotgun disorganization of the anterior fourth of the left hemisphere, which I reported to this Society some two years ago.

"*The principle of free drainage, then, rather than the mere removal of the foreign body, is the guiding principle of the modern treatment, although to effect perfect drainage, both theoretically and practically, the course of the ball must be followed throughout and disinfected, when the missile being accessible, and capable years hence of producing serious trouble, should be removed.*"²

CASE I. *Ball wound of the anterior lobes of the brain; failure to find the ball, owing to its deflection by the base of the skull; drainage of the track; recovery.*—Henry C., æt. fifty-three years, was brought to the Jefferson Medical College Hospital, by the Police

¹ Philadelphia Medical Times, 1879.

² THE MEDICAL NEWS, January 28, 1888.

Patrol, at 7 A.M., September 15, 1888, having been found lying at the corner of Twelfth and Spruce Streets, suffering from a bullet wound of the right temporal region, about one and three-quarters inches behind the external angular process of the frontal bone, and the same distance above the zygoma, the ball-track passing downward, forward, and inward to the bone, which was bared and slightly depressed. The man presented no signs of mental or cerebral disturbance, beyond what could be readily accounted for by the ascertained fact that he had been on a week's spree. He slept quietly for some hours after admission, and at 1 P.M. he was etherized at the clinic, when, assisted by my colleague, Dr. Barton, I proceeded to operate as follows:

A large semilunar flap was freely reflected, exposing a slightly starred and depressed portion of bone directly over the course of the middle meningeal artery, but no *perforation* was apparent. Convinced that penetration had occurred, with partial replacement of the small, trapdoor-like fragment from intracranial pressure, I trephined, removing a number of depressed fragments of the inner table, which enabled me to see a perforation of the dura mater, and recognize that the middle meningeal artery was wounded.

After partially arresting the very free hemorrhage from this vessel, and enlarging the bone opening with the ronguer, the patient's head was placed so as to render the ball-track as nearly vertical as possible, when the aluminium gravity probe¹ was introduced, and allowed to *gravitate* along the ball-track, which it readily did, until it struck the base of the skull—somewhere about the lesser wing of the sphenoid bone, it was thought. Thus determined,

¹ Fluhrer's.

the track was carefully examined by a Nélaton's probe, but without detecting the ball. Further search demonstrating the probable truth of one of two alternatives, viz. : (1) that the ball had perforated or was imbedded in some one of the bones forming the base of the skull, which view was favored by a bared surface of bone with a doubtful sensation of perforation ; and (2) that the ball had struck this bared portion of the base, and had been deflected, burying itself in the opposite frontal lobe ; this latter is the view I am inclined to hold.

The manipulations with the brain proper must have occupied fully half an hour, comprising the repeated introduction of probes and forceps, the length and frequency of which manipulations I wish to lay stress upon. Failing to find the ball, a drainage-tube was carried along the whole track of the wound in the brain, and a careful antiseptic dressing was applied, all hemorrhage from the middle meningeal artery having now ceased.

There was little, if any, shock from the operation, no symptoms of paralysis or paresis at any time ; no visual, aural, or olfactory disturbances, and, in fact, no cerebral symptoms beyond some slight hebetude and a moderately severe headache during the first five days, which returned partially on a few occasions—usually after dressing the wound—but was promptly relieved by a laxative. Rest in bed, milk diet, and an occasional laxative, comprised the after-treatment.

September 30. Prof. Victor Horsley, of London, saw him with me to-day, and concurred in the diagnosis as to the position of the bullet, finding nothing abnormal in the pupils, reflexes, sensation, or motion.

His temperature before operation was 100° F., reached 101.1° the same evening, touched 101° on the seventh day, and during the second week was

about 99.5° at night, 98.5° in the morning, after which it kept below 99° . The pulse was always about normal as to frequency, etc.

I would call attention to some important lessons taught by this case, viz., that the gravity probe will readily, surely, and safely follow the course of a bullet through the brain; that prolonged manipulation of the brain, if guarded by reliable antiseptic precautions, is harmless, and that thorough drainage and disinfection of ball-wounds of the brain will avert that generalized suppuration, the result of infection, which proves so fatal after such injuries. This is the second case recently in which I have introduced a drainage-tube in the bullet-track in the brain with recovery of the patient; the one here reported returned to Boston four and a half weeks after the accident, a minute granulating point remaining, suggestive of a fragment of dead bone.¹

It is interesting to remark, that the wound I made healed per primam, without suppuration, while the ball-track in the soft parts, having been exposed for some hours before antiseptic measures were instituted, after sufficient time for development of the microorganisms had elapsed—*i.e.*, about one week—presented a slight amount of suppuration. Had the opposite extremity of the wound-track been at an accessible portion of the skull, I should have unhesitatingly trephined at that point, and would, probably, have then been able to find and extract the missile.

¹ I have recently learned that this man has remained well.

CASE II. *Excision of the thumb-centre for Jacksonian epilepsy; recovery, with non-recurrence of the attacks.*—Charles L. R., æt. twenty-seven years, with a good family history, containing no record of epilepsy or of any chronic neurosis, states that up to nine years of age he was in perfect health, at which time he was struck upon the left parietal region with a piece of wood with such violence as to be rendered unconscious for three hours. Immediately after regaining consciousness he was seized with a convulsion, which recurred three times in rapid succession; he is positive that it was right-sided chiefly, and, he is told, resembled those which he has recently had. For the next three months he had a diurnal paroxysm, followed by an intermission of two weeks. Next in order was a period of five months, when the fits were repeated three to four times daily, again to be followed by a two weeks' intermission. From ten to fifteen years of age he averaged five seizures a week, while from fifteen to twenty years he was attacked slightly less frequently, averaging only about four fits a week. From twenty years of age until May 7, 1888, the number of attacks increased, so that while he has always had at last a diurnal attack, they have varied in numbers from this up to forty per diem.

He has been under treatment at various institutions, such as Bellevue Hospital, New York, and the University Hospital, Philadelphia, without benefit, until on May 7, 1888, Dr. Steinbach removed by trephining, at Blockley Hospital, an inch and a half button of very dense bone from the middle of the left anterior parietal region, the posterior segment of the trephine cut slightly overlapping the line of the Rolandic fissure; at this time a scar in the scalp overlying the portion of bone removed, was excised,

because pressure upon this cicatrix excited the paroxysms, which, as I am informed by Dr. C. K. Mills, *commenced on the left side—i. e.*, were evidently dural, or, at least, of fifth pair origin. The button was replaced, the wound did well, and the paroxysms did not recur except once, ten days after the operation, until September 29, 1888, a period of nearly five months, when he came under my care, and was admitted September 1st to the Jefferson Medical College Hospital.

August 3, 1888, Dr. W. W. Keen admitted this man to his wards at St. Agnes's Hospital, where he removed the partially necrosed button of bone from a bed of granulations, a suppurating sinus leading down to the fragment.

A careful study of about twenty-five attacks which he had in the hospital during the three days prior to the operation demonstrated that the following order of phenomena was always observed: A sharp pricking pain darts from the seat of the injury toward the median line of the head, a numb feeling is sometimes experienced in the right leg, the right side of the face flushes, and often his vision becomes hazy with flashes of light before his eyes. These prodromata proceed so slowly, that the man asked to be allowed to lie down, recognizing that an attack was coming on. Almost coincidently with these sensations the right thumb is strongly flexed upon the palm, the wrist and fingers are next extended, with only partial action of the interossei, for there an imperfect "claw-hand" formed; the forearm and hand then become strongly but slowly pronated, when flexion at the elbow with rigid fixation of the extremity in the position just mentioned, obtains. Closely following these movements, the head is rapidly and powerfully flexed laterally to the right,

with marked rotation to the same side; the tongue is thrust out to the right between the rigidly opened jaws; coincident with all which is conjugate ocular deviation to the right. These movements are all tonic, occupying about nine-tenths of the paroxysm, to be followed by generalized clonic movements, most marked upon the right side, occupying the remainder of the period; the loss of consciousness is always complete.

I had the advantage of studying three of the paroxysms in conjunction with my friend Dr. Morris J. Lewis, who kindly noted the sequence of the phenomena, as above recorded.

The day previous to the operation, after careful shaving, cleansing, and disinfection of the scalp *a la* Horsely, with the aid of Dr. M. J. Lewis, I located the fissures of Rolando and Sylvius, the former of which I marked with a point of nitrate of silver, and the latter at its commencement only by the same agent; in addition, the presumed position of the thumb-centre, which it was proposed to remove, was marked out upon the scalp at the exact position where after the operation it was found to lie. Dr. M. J. Lewis's modification of Thane's and Horsley's method, Hare's method, and the ready method of Lucas-Championnière, the latter only for determining the bregma, were used to locate the Rolandic fissure, which the after-evidence afforded by the operation proved to have been absolutely correct, although the man's head was so exceptionally large as to require a lengthening by some inches of Dr. Lewis's instrument, which allowed for a head measuring thirteen inches. A thorough cleansing, renewed disinfection, and a bichloride dressing, were in turn made use of, and the patient remanded to the ward.

Up to two o'clock on this day the patient had *ten* attacks.

October 4th, in the private operating room of the Jefferson Medical College Hospital, in the presence of Prof. S. W. Gross, W. W. Keen, my colleagues Drs. Hearn, Allis, Barton, and Wirgman, who kindly assisted me, Dr. M. J. Lewis, who managed the battery, Drs. Dercum, J. M. Taylor, Usilton, Neilson, etc., my interne, Dr. McDonald, and many undergraduates, I proceeded to operate, Dr. Callender administering ether, the patient having received one-quarter of a grain of morphia hypodermatically about one and a half hours previously, and f3ij ext. ergot. fluid. in divided doses during the morning; just before profound anæsthesia was induced, the patient had a characteristic but slight paroxysm.

The extremities of the Rolandic line were marked by nicks in the bone, a large horseshoe-shaped flap, including the periosteum, was reflected, whose centre was attached to the thick and exceedingly dense fibrous tissue—fully three-sixteenths of an inch thick—which filled the old trephine opening. The attempt to control the bleeding from the scalp vessels by an Esmarch tube proved abortive. The crown of a medium-sized trephine was applied below and somewhat anterior to the old trephine cut, to enable me to reach the non-attached area of dura and pia mater. The bone was exceedingly dense. The dura mater having been incised, it was found that, except below and behind, the membranes were firmly attached over nearly the whole of the lower two-thirds of the motor area. This cicatricial mass was carefully dissected off from the subjacent brain, the two trephine openings having been united by cutting away the intervening bony ridge, and the bony orifice enlarged in all directions by the rongeur, until

portions of the membranes which were unattached to the brain were reached. All cicatricial tissue having been excised, including an ovoidal portion of the membranes, about two by two and three-quarters inches, and the fissure of Rolando found, Dr. Morris J. Lewis kindly proceeded to locate the thumb-centre by the battery.

When a spot in the ascending parietal convolution, corresponding to the focal point indicated by Horsley, was reached, *i. e.*, in the second fourth, from below upward, the thumb suddenly flexed, and at once, although profoundly anæsthetized, an epileptiform paroxysm ensued identical in its sequences and details with those observed before operation. Owing to the bone opening requiring to be slightly enlarged opposite this point, the centre had twice again to be located by the battery, each application at this spot, and this only, reproducing an attack. It is of very great interest to note this, for while the discharging centre has been several times located by electricity, I believe that this is the first instance upon record in which a generalized convulsion has been produced by the excitation by this agent of the discharging lesion, although Macewen mentions one in which the curette provoked a paroxysm. Again, although *nothing but boiled water* was allowed to touch the cortex, a strong electric current was required, and no response was obtained in the area assigned to the thumb in the ascending frontal convolution. The shoulder, elbow, forearm, and facial centres were readily picked out, and are situated as delineated by Horsley.

One-half inch of the whole breadth of the ascending parietal convolution was excised, the apex of the wedge reaching into the corona radiata; after this section had been made both the thumb motions

were lost and no paroxysm could be excited by the application of the electrode to this spot.¹

The hemorrhage from the vessels of the pia mater, which must have amounted to from eight to ten ounces, having been in great part arrested by the pressure of *serre-fines* applied as each vessel was divided, was now permanently arrested by fine gut ligatures very carefully tied by Dr. Allis, and the main trunk, or a branch of the middle meningeal artery, was secured by passing a needle armed with a gut ligature through the dura mater. A final irrigation with the mercuric solution was made, and the flap was rapidly sutured with silk-worm gut and fine silk, small rubber drainage tubes having been previously introduced at the two most dependent portions of the wound.

The patient now and subsequently vomited, apparently, all the ergot injected. The combined effect of opium, prolonged anæsthesia (the patient was fully two hours under ether), loss of blood, and electrical excitation of the brain produced such an alarming amount of shock that only by the most vigorous use of artificial respiration and the battery, atropia, digitalis and whiskey hypodermatically, hot water enemata, etc., was a fatal termination averted.

Upon recovering consciousness all power in the thumb was found to be lost, flexion and extension of the hand, fingers, and wrist were enfeebled, there was nearly complete right-sided facial paralysis, and loss of power of the same side of the tongue, with

¹ No more of this centre was removed, which is said by Horsley to extend into the ascending frontal convolution, because of the impossibility of locating it by the battery and on account of the belief that much of his trouble was due to the extensive meningeal adhesions which had all been dissected away.

almost total aphasia. Unquestionably all these paretic symptoms, except those pertaining to the thumb and wrist, must have been due to the combined effect (1) of dissecting off with the adherent pia mater a portion of the external layer of large motor cells of the cortex, as was inevitable from the dense cicatricial nature of the adhesions; and (2) from the deprivation of the cortical centres of speech and the seventh and ninth nerves of their due vascular supply from the destruction of so much of the pia mater whose vessels are mainly terminal. The temperature was, at 10 P.M., 98.2° , pulse 108.

Oct. 5. The wound was dressed in the evening, the blood-stained dressings removed with the drainage tubes, and mercuric dressings reapplied. Temperature, morning, 100.1° , pulse 108; evening temperature 100° , pulse 108.

Upon the third, fourth, and fifth days the wound was redressed, and an attempt made to relieve tension which seemed great, the flap being much elevated, but the probe gave vent to only a few minims of bloody serum, proving that there was no real accumulation of wound-fluids, but that there was protrusion of the brain tissue through the bony opening. A tight stitch was cut on the third day. On and after the third day the temperature remained under 100° , usually nearly or actually normal; while the pulse fell to 70, between which point and 90 it fluctuated until the second week, when it became and remained normal.

By the fifth day after the operation the *paresis* of the hand and wrist had become almost complete *paralysis*, only the most prolonged efforts of the will *at times* producing slight movements of flexion *when the wrist was extended*. This condition persisted for thirty-six hours, when it rather suddenly

improved, coincidently with the subsidence of the elevation and tension (?) of the flap; at the same time the aphasia and seventh and ninth pairs' paralysis began to disappear. About the eighth day, doubtful movement in the thumb was noted, which by the tenth day amounted to distinct but feeble flexion yet the grasping power of the other fingers was strong; while at the end of twenty days the patient had regained all the movements and power of the hand, except that the thumb was weak, and while he could unbutton his vest, he could not *button* it, *i. e.*, the coarser movements remained while the more delicate were, as was to expected, lost.

The patient's general condition was throughout excellent, the stitches were removed, some on the eighth, the remainder on the eleventh day, except two which had been overlooked, while not one drop of pus formed. Becoming impatient of restraint the man eloped October 28th, twenty-four days after operation. So far no convulsions have occurred, but it is, of course, entirely too soon to decide whether the operation will permanently relieve the paroxysms.

In conclusion, I am inclined to criticise my procedures as follows: I believe that morphia was injurious and conjoined with the ether tended to produce the marked respiratory failure, while it can hardly be necessary in operations for epilepsy in which the excised portions of brain are not usually large and are never deep-seated. Electrical excitation of the encephalon is injurious, especially with the strength of current I was compelled to resort to, and in consequence the desired point once located should immediately be marked and removed, to avoid

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the necessity for a repetition of the application. Anæsthesia, especially when induced by ether and preceded by morphia, should never be prolonged a moment more than necessary, and should not be pushed to its extreme limits. As a corollary to this, the mapping out of the Rolandic fissure and other points on the scalp should be done the day before, as I did, with some indelible agent, so that neither hurry in determining these all essential points nor *prolongation* of the anæsthesia will be necessitated.

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